USDA United States Department of Agriculture

2016 Forest Health highlights

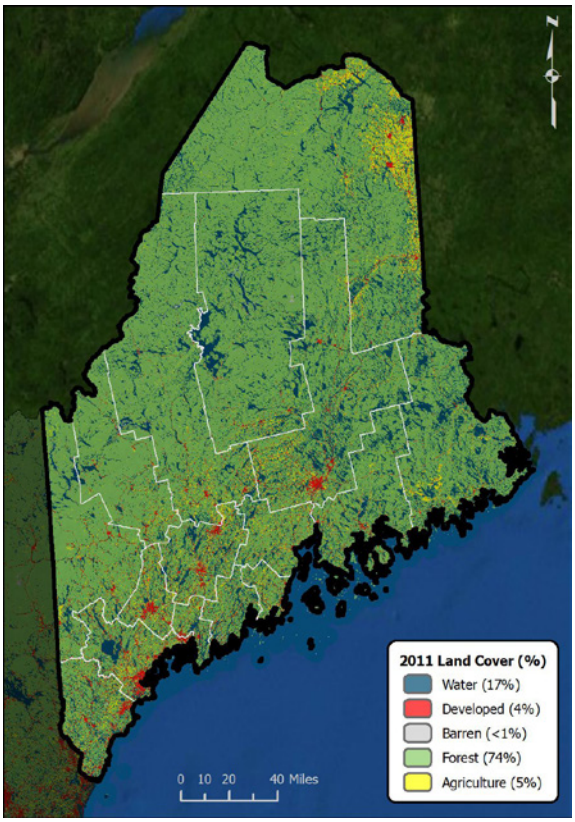
MAINE

Forest Resource Summary

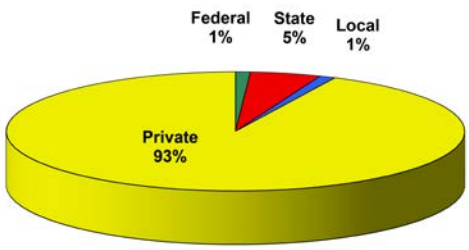
Ownership of Maine's forested land area has remained stable since 1960. There are approximately 17.6 million forested acres in the State. According to the 2015 Maine forest inventory, privately owned timberland makes up about 90 percent of the forest land area while public ownership, including some reserved lands, is about 10 percent of the total forested area. The 1 percent of the land that is federally owned encompasses the eastern portion of the White Mountain National Forest, most of which is in New Hampshire, and Acadia National Park.

The forest resource is made up of a wide variety of forest species, more than half of which is spruce and balsam fir; the other half is comprised of red maple, sugar maple, pine, hemlock, northern white-cedar, yellow birch, paper birch, beech, oak, and other hardwoods and softwoods.

Maine's forests provide much of the raw materials to fuel the State's mills and serve as the backdrop for the recreation industry. The State's forests also provide watershed, environmental, wildlife, and recreational benefits. Forested parks and individual shade trees provide similar amenities in urban and suburban settings.



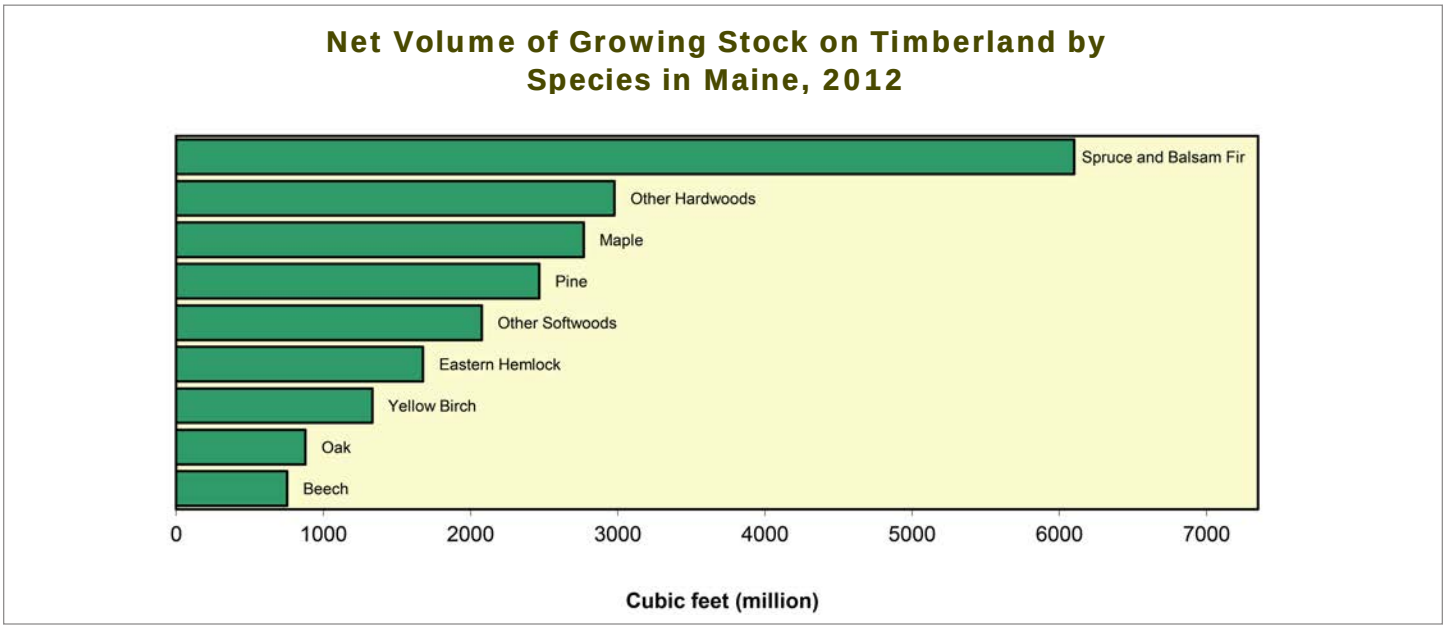
Forest Land Ownership in Maine, 2012



Forest Service
Northeastern Area
State and Private Forestry

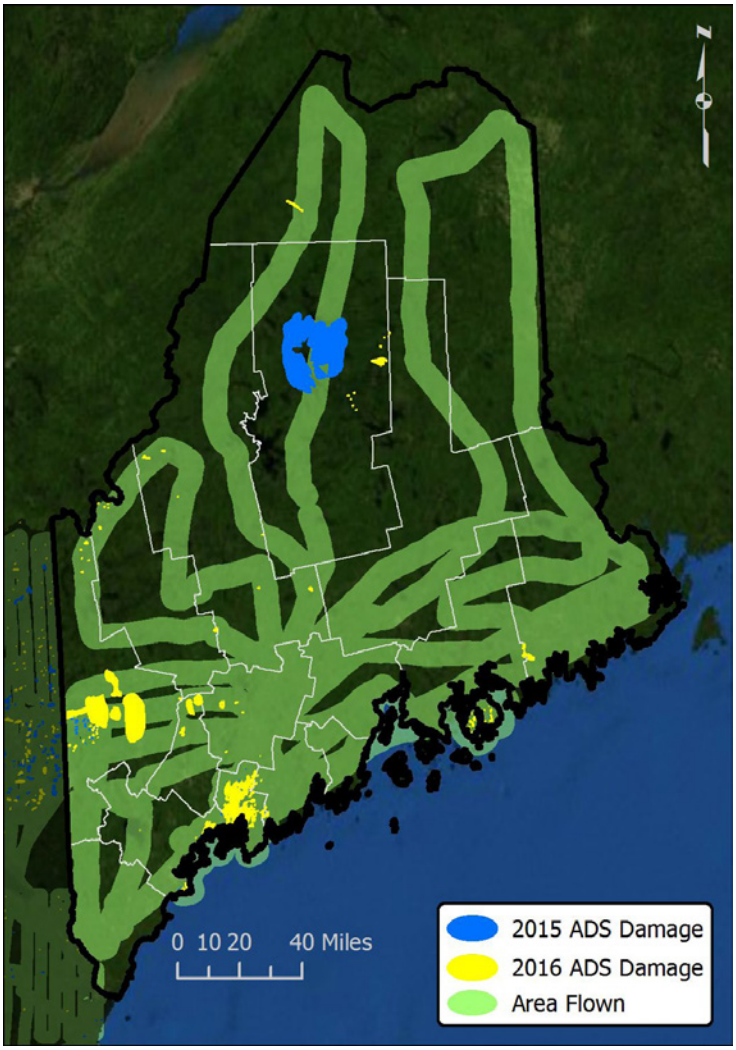
Maine Department of Agriculture
Conservation and Forestry
Maine Forest Service

June 2017

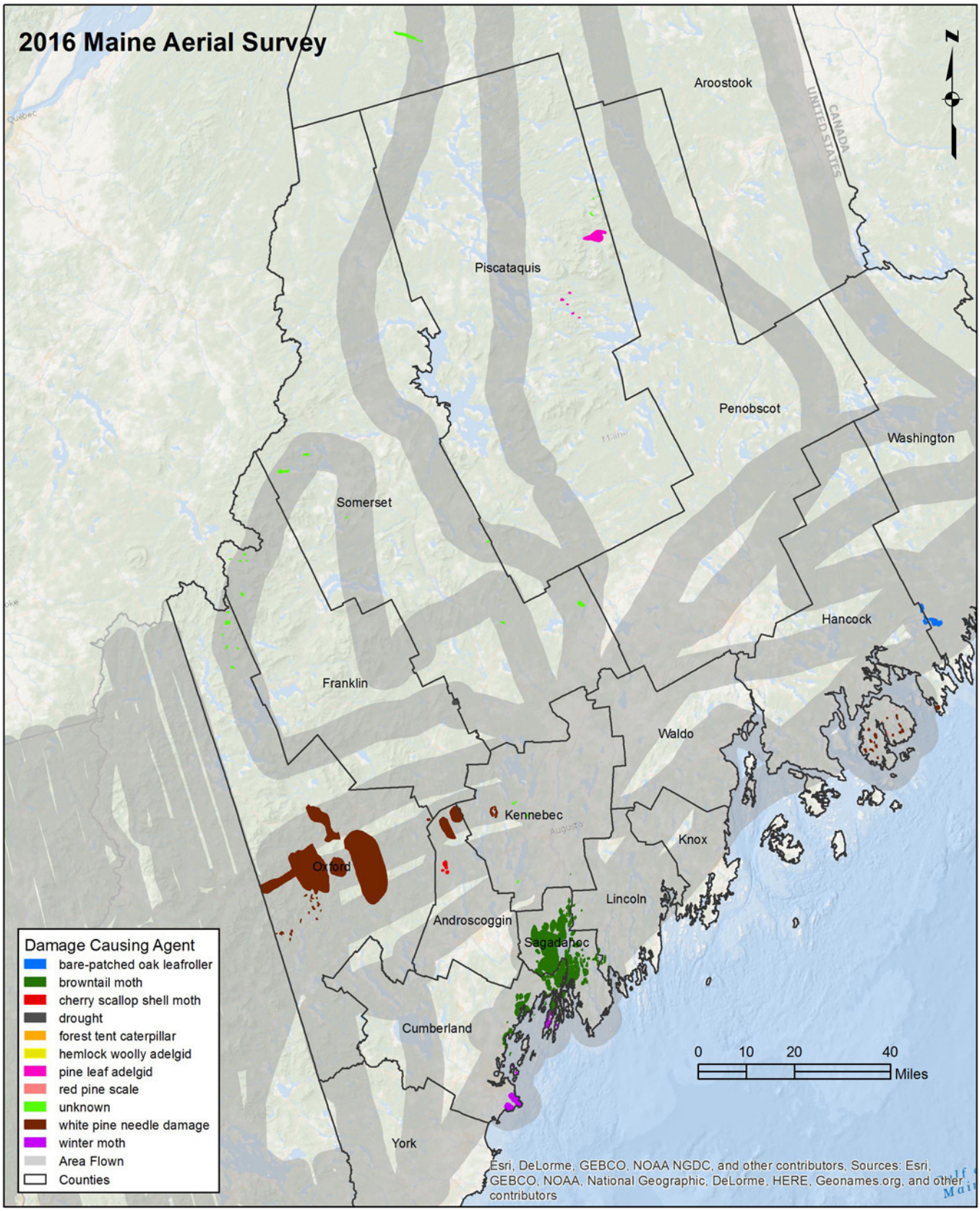


Aerial Surveys

Aerial detection surveys were flown over 13.9 million acres in Maine in 2016. There were about 220,000 acres of damage mapped, slightly less than the acreage mapped in 2015. More than half of that acreage was due to white pine needle damage (about 129,500 acres). Defoliation from the browntail moth was heavy with about 25,000 acres mapped in June and about 65,000 acres affected by the second generation newly hatched caterpillars in late August. There was also some defoliation recorded from winter moth (5,869 acres), bare-patched oak leafroller (2,955 acres), and cherry scallop shell moth (1,110 acres), and about 15 acres of damage from forest tent caterpillar. There was some crown discoloration from drought on a little more than 600 acres and 200 acres of mortality from red pine scale. Branch flagging on white pine from pine leaf adelgid in Piscataquis County was much less severe than in 2015 with only about 4,500 acres mapped (compared to more than 200,000 acres in 2015).



Comparison of aerial detection survey (ADS) results for Maine in 2015 and 2016. (Map: U.S. Forest Service, Durham, NH)



USDA Forest Service
Northeastern Area, State and Private Forestry
Forest Health Protection, Durham, NH.
http://www.na.fs.fed.us/fhp/index.shtm

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March 2017 (RL)

(Map: U.S. Forest Service, Durham, NH)

Forest Damage

Insects

The **browntail moth** (*Euproctis chrysorrhoea*) population exploded in 2016 with 24,975 acres of defoliation mapped in June 2016. Areas affected by spring defoliation included much of Sagadahoc County and coastal towns in Cumberland County. Hundreds of calls came in from people affected by the browntail moth rash or concerned about their trees. Ground surveys and citizen reports of browntail moth defoliation came in from six additional counties: Androscoggin, Kennebec, Knox, Lincoln, Waldo, and York. In July, moths were collected from light traps in five more counties (Hancock, Franklin, Penobscot, Piscataquis, and Washington), although these may not result in infestations.

Browntail moth eggs hatch in August, and the larvae feed briefly before making overwintering webs. There was so much damage from this early-instar feeding that it was visible from the air. An August 30 flight produced a map of almost 64,500 acres of red oak affected by late-summer feeding. This is primarily an expansion of the spring-defoliated area in Sagadahoc County spreading into adjacent areas in Cumberland, Kennebec, and Lincoln Counties.

In the past 22 years, browntail moth defoliation has ranged from a few hundred acres to 10,000 acres in 2003. In the fall of 2015, 13,000 acres of late-summer damage were mapped. In the spring of 2016, damage was almost twice that amount and more than double the 2003 level. This pest is definitely expanding its range and intensity in Maine. In the early 1900s, the browntail moth was found across most of New England and into Nova Scotia. Its retreat to coastal Maine and Cape Cod, Massachusetts, may be attributed to the parasitoid *Compsilura concinnata* and the fungus *Entomophaga aulicae*, but

Browntail moth larvae preparing for winter after skeletonizing leaves. (Photo: Maine Forest Service)

entomologists are not positive about that or why it has persisted in those two locations and not others. Therefore, there is concern that the browntail moth could again greatly expand its range beyond Maine, or the population may collapse. If *Entomophaga aulicae* is important in suppressing the population, then the dry weather in 2015 and 2016 may be part of the reason for the current outbreak. Damp spring weather is an important component for a fungal epizootic to occur.

There is concern for tree health with early-spring defoliation followed by late-summer defoliation concurrent with drought conditions.

Browntail moth overwintering webs are visible at the tips of branches. Webs are made from silk wrapped around leaves and tied to branches. (Photo: Maine Forest Service)

Winter moth (*Operophtera brumata*) populations in some areas were not as high in 2016 as in 2015 due to early warm spring weather followed by cooling that allowed the winter moth to hatch but delayed bud break. The oak trees were then out of sync with larvae, and many dead larvae were found when samples were taken in May. Cumberland County had about 6,000 acres of defoliation in the annual aerial survey this year as opposed to more than 10,000 acres in 2015. But for the first time, mortality from winter moth was mapped with 300 acres in Cape Elizabeth. Drought was possibly a contributing factor in the demise of these trees. They succumbed after 4 years of defoliation and growing on poor, rocky sites. In ground surveys, defoliation ranged from light to heavy from Kittery to Rockland (Cumberland, Knox, Lincoln, Sagadahoc, and York Counties). The heaviest damage was in Cape Elizabeth, Peaks Island in Portland, Harpswell, and Chebeague Island (Cumberland County).

Winter moth trap set out in December to catch male moths. (Photo: Maine Forest Service)

The Maine Forest Service ran a pheromone trap survey in December 2015 to determine where winter moth populations were heaviest and to delineate the outer reaches of the infestation. Traps were deployed at 75 locations in towns along the coast and along a transect inland from known infested areas. The survey covered coastal portions of York, Cumberland, Sagadahoc, Lincoln, Knox, and Waldo Counties, and parts of Hancock, Androscoggin, and Kennebec Counties. Once again reports of moth observations were solicited from the public using a Survey Monkey form—more than 700 reports were received through this method and calls/emails to the office. A map predicting intensity of defoliation was produced from these surveys to help green industry professionals and homeowners prepare for the growing season.

No parasitic flies (*Cyzenis albicans*) were released in 2016, but winter moth cocoons containing fly larvae from Massachusetts were set out in Harpswell in November 2016 so that they could emerge naturally in the spring. Flies were recovered from Two Lights State Park in Cape Elizabeth and Fort McClary in Kittery in 2016, which was excellent news that showed quick establishment in these two locations.

Elongate hemlock scale (*Fiorinia externa*) was discovered on Frye Island (in Sebago Lake) in late summer 2016. It was almost certainly brought in on infested hemlocks planted approximately 20 years ago and has spread to a small number of nearby native hemlocks. The planted trees overhang the entrance to the fire station, and emergency vehicles brushed against infested branches every time they were called out over the last several years. Although no other infested areas have been found on the island, it is possible that elongate hemlock scale has been spread throughout the island by emergency vehicles. This is only the second location where elongate hemlock scale is known to be established in Maine and the most inland.

Hemlock woolly adelgid (*Adelges tsugae*) was discovered on Frye Island (in Sebago Lake) in late summer 2016. Although the southern part of the island showed no sign of hemlock woolly adelgid, the northern portion of the island was heavily infested, and we suspect it has been there for many years. Subsequent surveys discovered a few, small scattered populations of hemlock woolly adelgid in two towns (Raymond and Standish) on the lakeshore. We suspect that hemlock woolly adelgid was brought to the island by human activity and was carried to locations on the mainland by wind. This is the furthest inland that we have found hemlock woolly adelgid in Maine.

In November, close to 500 *Laricobius osakensis* beetles were released on Frye Island. This new hemlock woolly adelgid predator has never before been released in Maine. It was decided to release the beetle on Frye Island since this is an outlying, leading-edge population of hemlock woolly adelgid. A field insectary site was created with the intention of continuing to release and rear predators in the field for use in other areas of the State. The Town of Frye Island and its Public Works Department were very helpful by giving permission to use town land for several years to rear the predators and helping prepare the site.

The hemlock woolly adelgid predator Laricobius osakensis *is released on Frye Island in Sebago Lake, Maine. (Photo: Maine Forest Service)*

Diseases

White pine needle diseases have been impacting white pine trees for roughly the past 10 years. In 2016, heavy and widespread needle disease occurrence again resulted in extensive premature needle shedding in most places white pines grow in Maine. The primary pathogens responsible for the needle shedding are believed to be brown spot needle blight, caused by *Lecanosticta acicola* (formerly *Mycosphaerella dearnessii*), and Dooks needle cast, caused by *Lophophacidium dooksii* (formerly *Canavirgella banfieldii*). Losses of 1-year-old needles during late May through June resulted in numerous disease clinic requests for assistance in 2016. The white pine decline phenomenon remains widespread, but is most severe throughout central, western, and southern Maine. A July aerial survey revealed nearly 125,000 acres of severely impacted white pine in Oxford and Androscoggin Counties alone. Another aerial survey in the Baxter State Park area in August indicated disease presence and high severity in certain areas there as well. Due to the mostly consistent disease level over the past years, the implications of this chronic stress and potential for mortality are growing concerns. The Maine Forest Service will continue monitoring the white pine needle disease situation through formal and informal surveys in the coming years and be on the lookout for emerging insect or disease agents that could serve as further factors leading to white pine decline and mortality.

Orange coloration of white pine foliage heavily infected with a needle blight disease. (Photo: Maine Forest Service)

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Forest Health Programs

State forestry agencies work in partnership with the U.S. Forest Service to monitor forest conditions and trends in their State and respond to pest outbreaks to protect the forest resource.

U.S. Department of Agriculture
Forest Service
Northeastern Area
State and Private Forestry
11 Campus Blvd., Suite 200
Newtown Square, PA 19073
https://www.na.fs.fed.us

Forest Health Protection
Northeastern Area
State and Private Forestry
271 Mast Road
Durham, NH 03824
603–868–7714

Maine Department of Agriculture, Conservation and Forestry, Maine Forest Service
22 State House Station
Augusta, ME 04333-0022
207–287–4981
http://www.maine.gov/dacf/mfs/index.shtml

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